REMARKS

This is a request for reconsideration filed under 37 C.F.R. 1.116 in response to the final Office Action dated April 30, 2007.

I. ALLOWABLE SUBJECT MATTER

Claims 1 to 12 would be allowable if rewritten or amended to overcome the rejection under 35 U.S.C. 112, second paragraph, according to page 3 of the final Office Action. Reconsideration of this requirement and favorable allowance of claims 1 to 12 without further changes are respectfully requested.

II. REJECTION UNDER 35 U.S.C. 112, SECOND PARAGRAPH

Claims 1 to 12 were rejected under 35 U.S.C. 112, second paragraph, as indefinite for failing to particularly point out and distinctly claim the subject matter that the applicant regards as the invention.

Claim 1 was rejected as indefinite, because the values or ranges of x and y are not defined in the following wording in lines 2 to 4 of claim 1:

> **"...applying thin layers made at least of titanium oxide and silicon oxide having the general stoichiometry TiO_y and SiO_x..."**.

Presumably the dependent claims 2 to 12 were only rejected as indefinite because they depend on claim 1, since no indefinite wording in the dependent

claims was pointed out in the final Office Action dated April 30, 2007.

However it is respectfully submitted that the wording quoted from claim 1 above *does*, in fact, particularly point out and distinctly specify the composition of the alternating layers made by the PICVD deposition process because it clearly states that the thin layers are "at least made of" (i.e. comprise) "titanium oxide" and "silicon oxide" (claim 1, lines 2 to 4). There is nothing indefinite about the terms "titanium oxide" and "silicon oxide". These terms designate substances that respectively comprise titanium and oxygen and comprise silicon and oxygen.

One skilled in the chemical arts would clearly understand from the present wording of claim 1 that the alternating layers comprise titanium, silicon, and oxygen. **Claim 1 is only broad, not indefinite**, because claim 1 does not provide preferred limits for the atomic ratios of O/Si and O/Ti in the coating that is produced by the PICVD method. The fact that a claim claims broadly cannot be used alone to reject the claim under 35 U.S.C. 112, second paragraph, according to **M.P.E.P. 2173.04**. See, for example, M.P.E.P. 2173.04, and the US Court Opinions cited therein, such as *In re Miller. In re Miller's Court* held that if the scope of the claim is clear and if the applicants have not otherwise indicated that the scope of the invention should be different from that in e.g. the current claim 1, then the claim should not be rejected under 35 U.S.C. 112, second paragraph. In the case of the present invention the wording of claim 1, especially the rejected wording, is fully supported by applicants' originally filed specification at page 2, lines 1 to 7.

The situation is analogous to the situation of a composition claim in which

an organic compound is recited containing aryl radicals but the number of carbon atoms in the aryl radicals is not specified. It is well established that such a claim should not be rejected for indefiniteness. For example, the C.C.P.A. has held:

> **"While the term "aryl and substituted aryl radicals" is a broad term, it is not objectionable for this reason alone if the term is (1) supported by the specification, and (2) if it properly defines the novel subject matter described in the specification. The public purpose on which the patent law rests requires the granting of claims commensurate in scope with the invention disclosed. This requires as much the granting of broad claims on broad inventions as it does the granting of more specific claims on more specific inventions. It is neither contemplated by the public purpose of the patent laws nor required by the statute that an inventor shall be forced to accept claims narrower than his invention in order to secure allowance of this patent." *In re Sus*, 134 USPQ 301, 304 (C.C.P.A. 1962).**

Furthermore one skilled in the chemical arts, especially the PICVD or PECVD arts, would understand that the values of x and y mentioned on page 3 of the Office Action do not take all possible numerical values. The negative values of x and y are physically impossible. The most common value of x or y would be +2 in each case when sufficient oxygen is present in the plasma from which the layers are deposited, because the most stable oxidation state of Si or Ti is +4.

However the ratio of O/Si (x) and the ratio of O/Ti (y) would primarily depend on the composition of the plasma, i.e. the precursor compounds that are supplied to the microwave discharge, when sufficient or excess oxygen is not present. For example, if the silicon-containing precursor compound contained only one oxygen atom or less for each silicon atom, an x value of 2 would be unlikely.

The purpose of designating the "general stoichiometry" of the alternating layers as TiO_y and SiO_x in claim 1 is to indicate that the PICVD process is not expected to *always* produce alternating layers of TiO_2 and SiO_2, although these are the most stable oxides of these elements as noted above. The PICVD process, which is a plasma vapor deposition process, operates by a complex mechanism to dissociate gaseous organic compounds, such as tetraethoxysilane (TEOS) and tetramethoxysilane (TMOS), in order to deposit a film containing Si and O in various ratios O/Si (i.e. x) that do not necessarily correspond to 2. The ratio of O/Si in these plasma vapor deposition processes depends on the relative amounts of O and S present in the plasma, but also on the discharge conditions, such as discharge current and pressure. The same is true for the O/Ti ratio, i.e. y.

Copies of two scientific publications accompany this request for reconsideration. They include "Annual Report 2001" from the Fraunhofer Institut and "Plasma Surface Modification and Plasma Polymerization", by N. Inagaki of Shiznoka University. These publications are not considered prior art references that are material to the patentability of the claimed invention. However they disclose background information related to deposition of films containing silicon oxide and titanium oxide in PECVD or PICVD processes, such as the information in the above paragraph.

For example, paragraph 6.7.1, ***SiO_x*** *Films from Plasma Polymerization of Alkoxysilanes*, in "Plasma Surface Modification and Plasma Polymerization" describes a SiO_x coating that is formed in a plasma process from TEOS. This

paragraph indicates that the ratio of O/Si (i.e. x) varies with the conditions in the discharge, such as discharge current, but approaches 2.9 for the conditions of the particular experiments described in the paragraph. This shows that the O/Si ratio (i.e. x) in an actual application of the plasma vapor deposition method is well-known to be different from exactly 2 or 2.0, and is not necessarily an integer, for a plasma deposited coating comprising silicon oxide. Note that the specification of the above-identified U.S. Patent Application discloses that the preferred values of x and y are 2 in both cases in lines 21 to 25 of page 6 of the applicants' specification. The precursor or starting compounds supplied to the plasma reactor must be selected with these preferred values of x and y in mind.

Note that the reference "Plasma Surface Modification and Plasma Polymerization", by N. Inagaki shows that the term "SiO_x" is well-known in the plasma deposition arts and indicates that the ratio of O/Si in the deposited layers varies with the conditions in the PICVD or PECVD process. Thus it would be incorrect to designate a particular value of x or y or even a range of values of x or y, when the coating is deposited from plasma, because x or y varies in a complicated way, which may not be fully understood, with the parameters and conditions of the plasma and with the chemical composition of the plasma. Probably there is not enough known about microwave discharge plasma properties and conditions in gases of complex polyatomic species to be able to reliably specify ranges for x and y, but the formulae SiO_x and TiO_y in claim 1 serve to indicate that the ratios of O/Si and O/Ti vary with plasma conditions and parameters and chemical composition of precursor compounds.

Also a copy of the "Annual Report 2001" from the "Fraunhofer Institute" accompanies this request for reconsideration. This annual report lists the publications of the prestigious Fraunhofer Institute for the year 2001. One of the publications is entitled "Basic Investigations on silicon oxide (SiO_x) and titanium oxide (TiO_x) layers prepared by plasma enhanced vapor deposition (PECVD)". This report also clearly indicates that the terminology SiO_x and TiO_x is well-known in the art.

In addition, the attention of the Examiner is drawn to U.S. Patent 5,773,319, which accompanied the amendment dated March 9, 2007, which shows that the term SiO_x/TiO_x is well known in the plasma deposition arts. Claim 3 of US '319 describes the composition of a barrier layer recited in claim 1 as "comprises one of silicon-oxide layer or silicon-nitride layer". This description in the claim of an issued US Patent is similar to the wording, "made at least one of titanium oxide and silicon oxide" in lines 4 and 5 of the pending claim 1, and thus shows that such wording is not indefinite.

The inclusion of the wording "having the general stoichiometry TiO_y and SiO_x" is a valuable addition to claim 1 because it alerts or reminds those skilled in art that the ratio of O/Ti and the ratio of O/Si in the deposited layers depend on the conditions and composition of the plasma from which the coating is deposited. Furthermore this wording must be interpreted in connection with the other wording in the claim, especially the limitation to the PICVD process. In fact, this wording makes the claim a better and more accurate description of the claimed inventive method for that reason and should be retained in method claim

1.

In addition the Courts have long recognized that it is not only permissible but often desirable to use new terms, such as the above SiO_x and TiO_y, to characterize a claimed invention, when a technology such as plasma chemical vapor deposition is in a developing stage. Also it is important to recognize the limitations of language in describing such inventions in a developing technology on the requirements for precision and accuracy. See M.P.E. P. 2173.05 (a) in this connection.

For the reasons in the above paragraphs it is respectfully submitted that the wording "having the general stoichiometry TiO_y and SiO_x" is a valuable addition to claim 1 because it alerts or reminds those skilled in plasma vapor deposition arts that the ratio of O/Ti and the ratio of O/Si in the deposited layers depend on the conditions and composition of the plasma. This wording should not be deleted from claim 1 but should be interpreted according to the other wording in the claim including the limitation to a PICVD method.

For the foregoing reasons withdrawal of the rejection of claims 1 to 12 as indefinite under 35 U.S.C. 112, second paragraph, is respectfully requested.

Should the Examiner require or consider it advisable that the specification, claims and/or drawing be further amended or corrected in formal respects to put this case in condition for final allowance, then it is requested that such amendments or corrections be carried out by Examiner's Amendment and the case passed to issue. Alternatively, should the Examiner feel that a personal

discussion might be helpful in advancing the case to allowance, he or she is invited to telephone the undersigned at 1-631-549 4700.

In view of the foregoing, favorable allowance is respectfully solicited.

Respectfully submitted,

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